

On the presence of the Madeiran sardinella *Sardinella maderensis* (Clupeidae) in the Gulf of Valencia (Western Mediterranean)

by

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RÉSUMÉ. - Présence de *Sardinella maderensis* (Clupeidae) dans le golfe de Valence (Méditerranée occidentale).

La présence de *Sardinella maderensis* (Clupeidae) dans le golfe de Valence (Méditerranée occidentale) est confirmée pour la première fois. Cette découverte pourrait indiquer un déplacement de la distribution de l'espèce en réponse au réchauffement climatique global.

Key words. - Clupeidae - *Sardinella maderensis* - MED - Gulf of Valencia - Global warming - Record.

The Madeiran sardinella, *Sardinella maderensis* (Lowe, 1838) is a clupeid species distributed around the eastern coasts of the Atlantic Ocean, from Morocco to Angola. It is also present around the coasts of the southern Mediterranean Sea, particularly in the Eastern region, where it penetrates into the Suez Canal (Whitehead, 1984). It is a pelagic species with commercial interest, as it is, together with other fishes, the base of some fisheries of the north-western coasts of Africa (Hofstede and Dickey-Collas, 2006). The species inhabits the neritic environment, and prefers water temperatures above 24°C, being able to tolerate estuarine low-salinity waters (Fischer *et al.*, 1987).

Lozano Rey (1947) found the species to be abundant on the Mediterranean coast of Morocco, and considered that the presence of the species in the southern coast of the Iberian Peninsula needed confirmation. Reina (1987) did not find *S. maderensis* among the ichthyofauna of the south-eastern Spanish Mediterranean coasts, but he did find the round sardinella (*Sardinella aurita*), a congeneric species present in the area. On the other hand, both Whitehead (1984) and Fischer *et al.* (1987) locate the northern distribution limits of *S. maderensis* in the Mediterranean coasts of Iberia at the latitude of Cape La Nao, but they do not provide references to the original findings that would indicate these limits. Close to the North of this cape, in the so-called Catalan Sea, Lloris *et al.* (1984) carried out a detailed ichthyological study but they did not detect the presence of the Madeiran sardinella.

The presence of *S. maderensis* on the Mediterranean coasts of the Iberian Peninsula outside the northern latitudinal limits stated above, indicates an expansion of these northern limits in the area, opening new questions on the reasons for this expansion. During summer 2006, we could confirm the capture of this species (Fig. 1) by fishermen based in the Valencia Harbour (Eastern Spain). According to these fishermen the species was caught in a point located to the north of the harbour at about 10 m depth using gill-nets. We obtained from the fishermen seven individuals, with maximum and minimum total lengths of 30.5 and 15.5 cm respectively, and corresponding weights of 265.9 and 35.0 g. In figure 2, we show the place where these specimens have been caught, and indi-

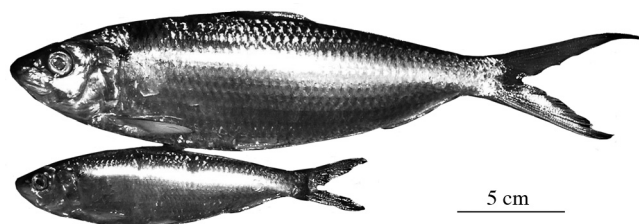


Figure 1. - Photograph of two individuals of *Sardinella maderensis* collected in the Gulf of Valencia.

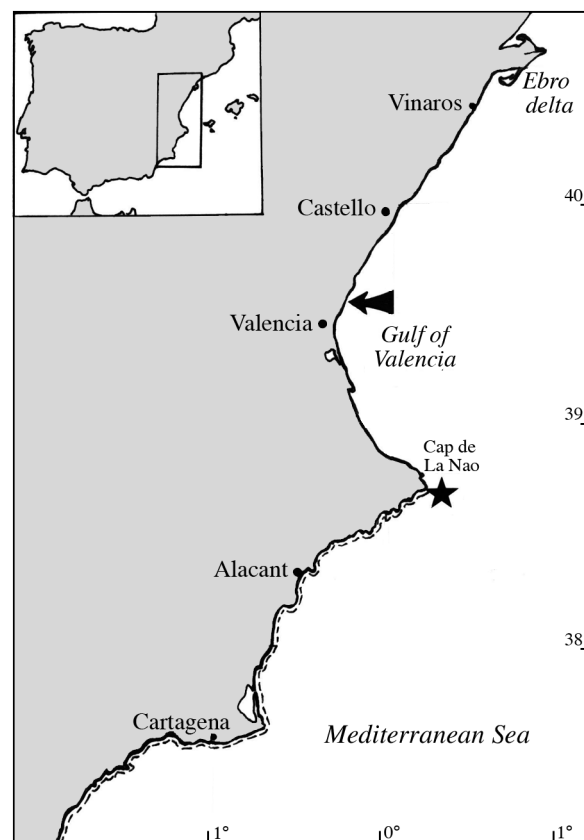


Figure 2. - Geographical location of the point where individuals of *Sardinella maderensis* were caught (arrow). The star indicates the position of the previously estimated northernmost limit of the geographical distribution of the species in the area (distribution range along the coast indicated with a dashed line).

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cate the expansion of the distribution area of the species known to date. The species has been observed again in Valencia during the following summer periods of 2007 and 2008, but only a few individuals and over scattered dates.

We suggest that its present occurrence in the waters off the Gulf of Valencia probably represents a new datum to add to the set of previously known biological data indicator of climate change (e.g., Root *et al.*, 2003), since this species is known to need water temperatures above 24°C; consequently, during the coming years it is expected to see an expansion to the north of the northern range limits in the Mediterranean coasts of the Iberian Peninsula. The slightly warmer waters around the Gulf of Valencia in comparison to the southern area of the Bay of Alacant could facilitate such expansion to the area of study. Another fisheries information that supports this hypothesis of global warming effects is the absence of records during the past decades of the European sprat *Sprattus sprattus* (Linnaeus, 1758) on the coasts of the Ebro Delta, where it was commonly found in previous times, since this is another clupeid species but with a range distribution opposite to that of *S. maderensis*, i.e., with a more northern distribution in the Mediterranean and southern limits in the area of the Ebro Delta.

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